

Department of Public Works Environmental Engineering Section



City of Milwaukee
and
Efforts to Reduce Flow in the Combined Sewer Area
FLOODING STUDY TASK FORCE MEETING
Thursday, February 24, 2011



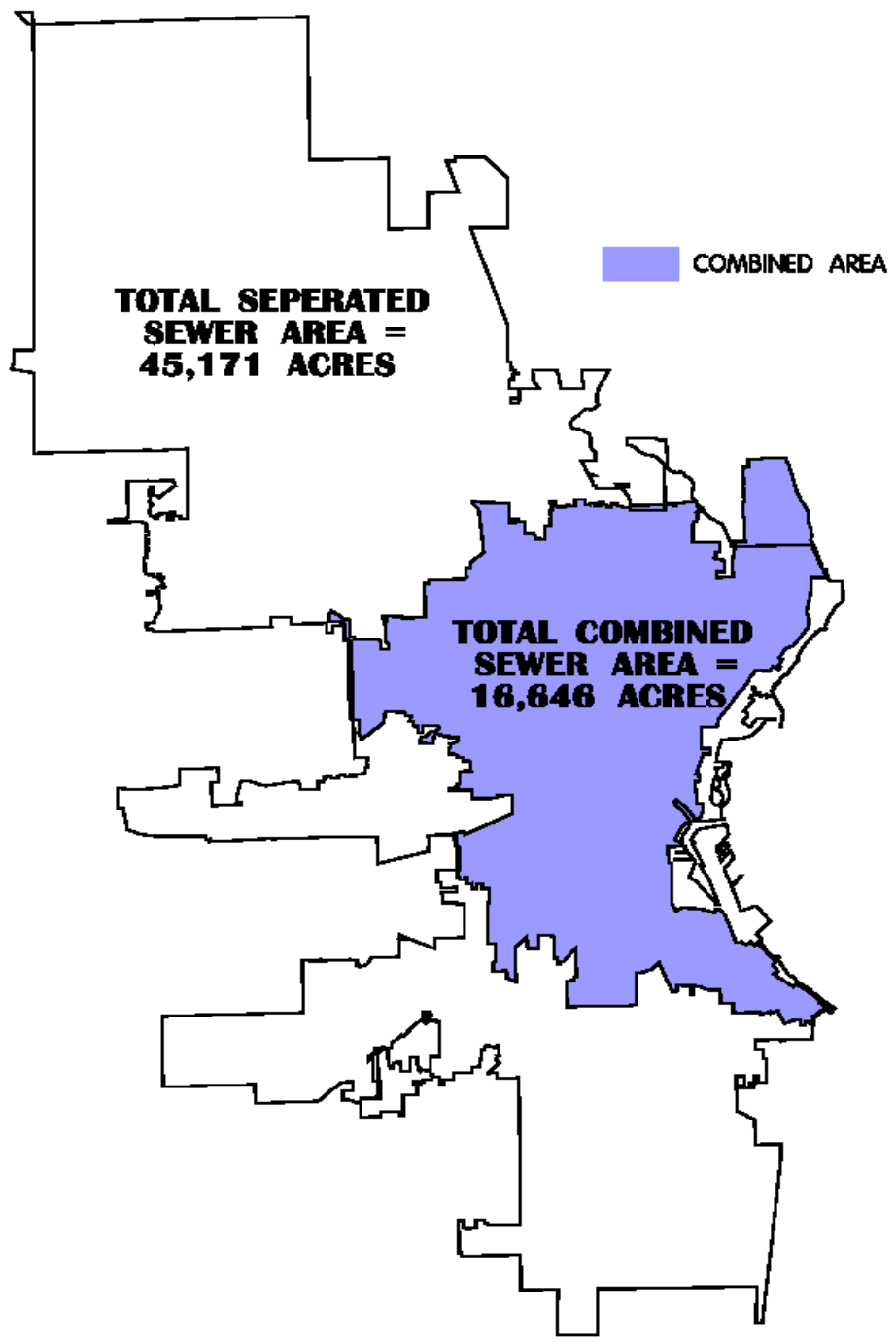
City of Milwaukee Sewers

Years Old

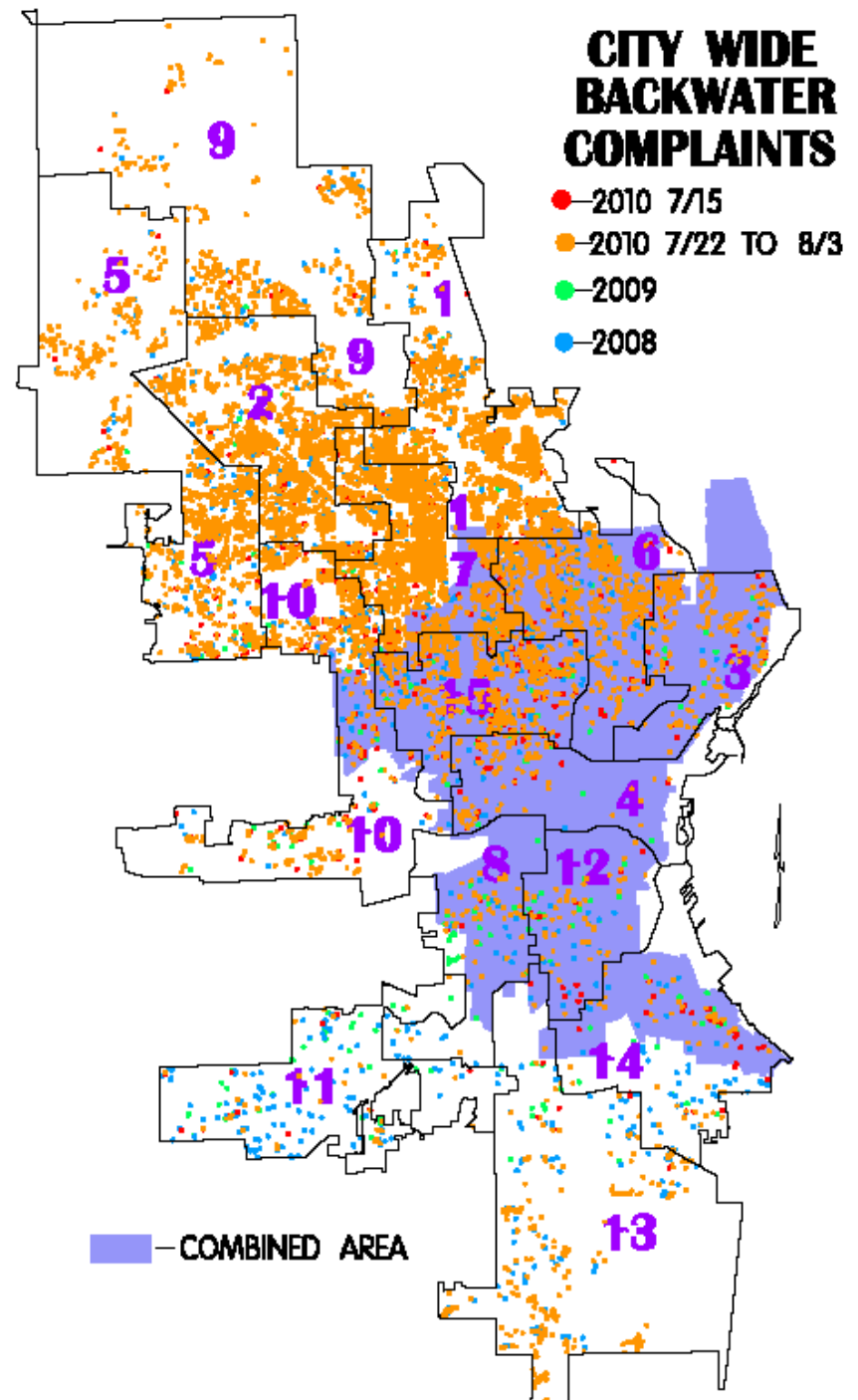
	Total Miles	0 to 50	51 to 90	> 90
Combined	547	252	110	185
Sanitary	939	396	536	7
Storm	960	371	583	6
Grand Total	2,446	1,019	1,229	198



- The combined sewer area is located in Milwaukee and Shorewood
- Approximately 26% of the City of Milwaukee is located in the Combined Sewer Area



- The majority of backwaters reported in the July 2010 storms were in the separated area

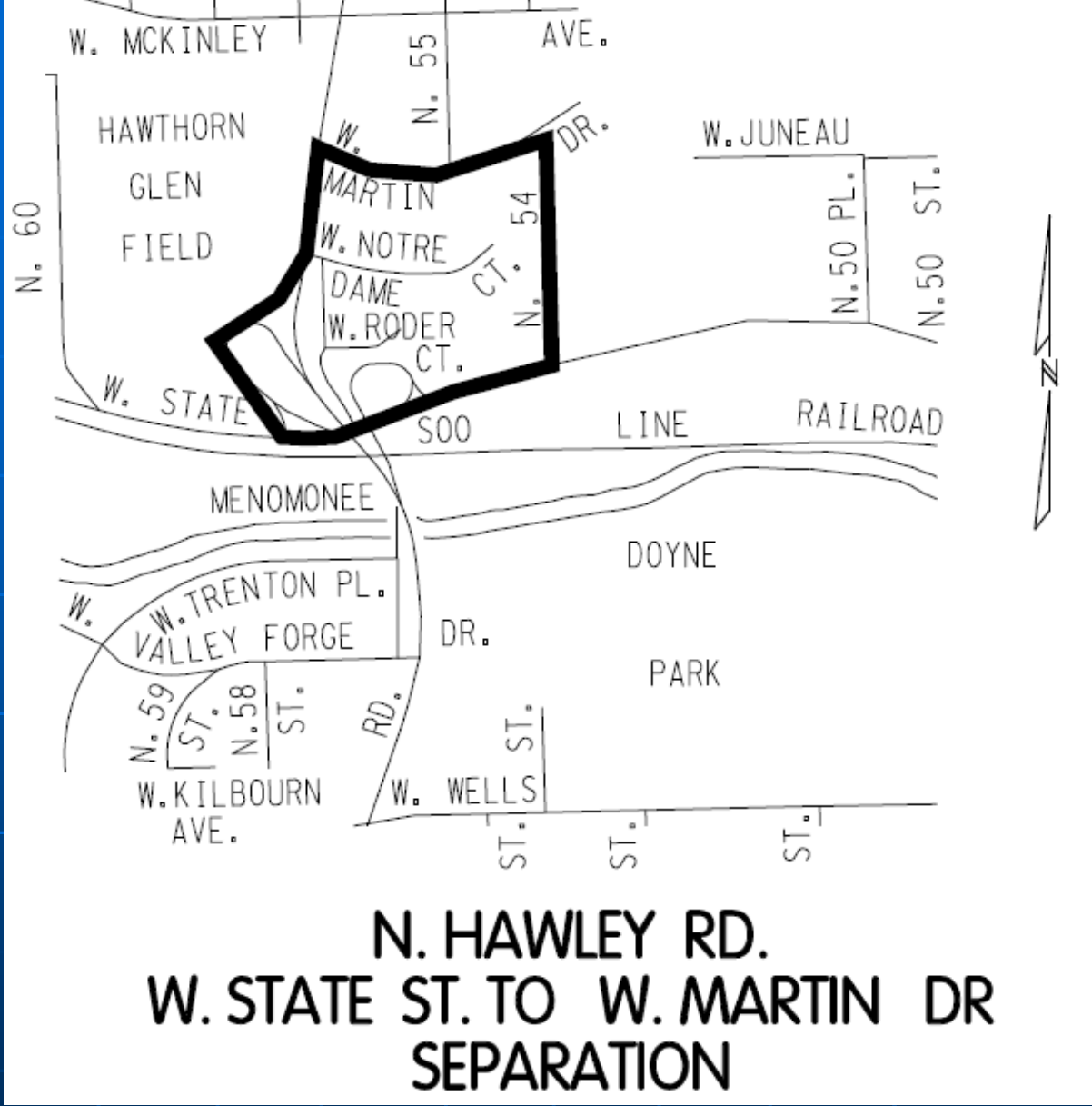


Washington Park Sewer Separation Project

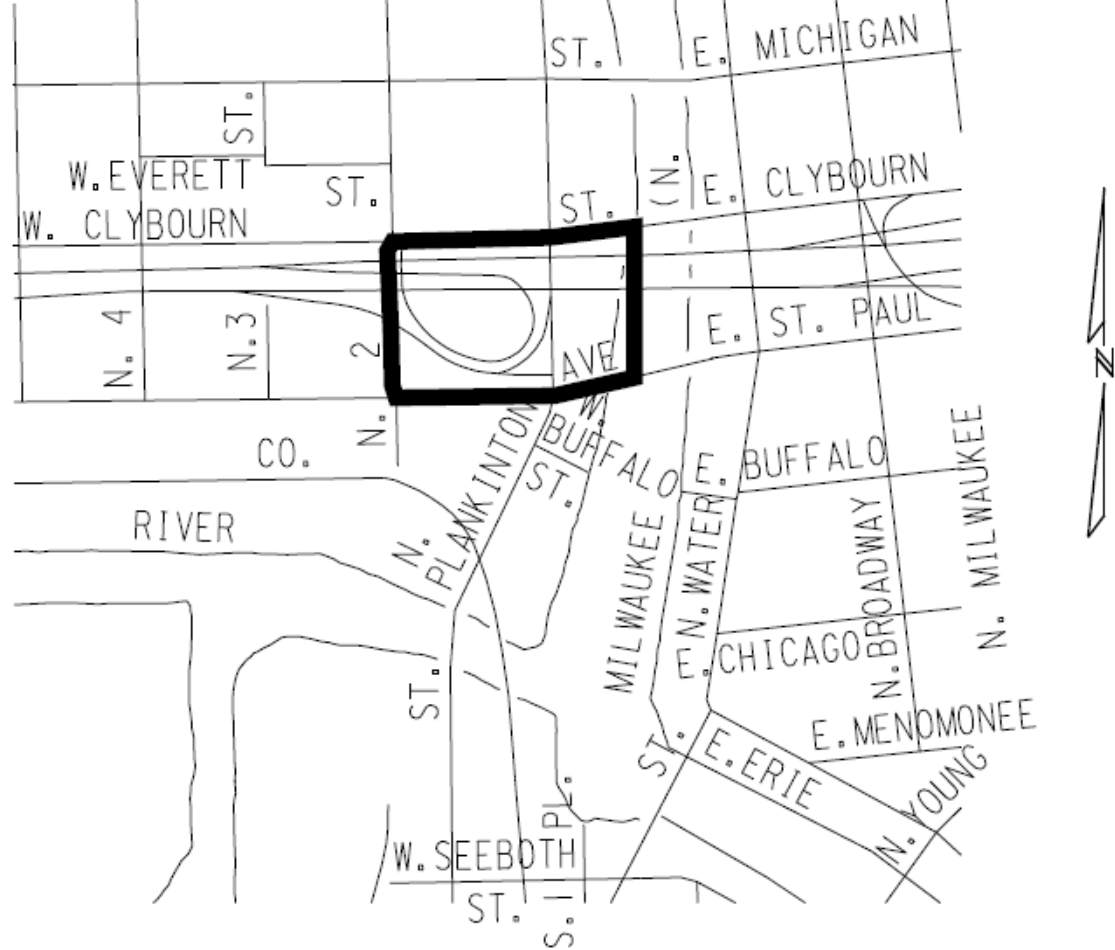
- Storm Sewers were constructed in certain locations in the area bounded by: N 35th St to N 55th St from W Locust St to the Menomonee River
- A 13-foot diameter sewer and a 8 by 9 foot double box sewer were constructed
- Storm sewers carried roadway drainage only
- Houses and lots still drain into the combined sewer



- A new storm sewer was constructed in N Hawley Rd to the Menomonee River to convey existing separated sewers



- Combined Sewers in N Plankinton Ave were replaced with sanitary and storm sewers
- Storm flow was diverted from the combined sewer to an existing storm sewer



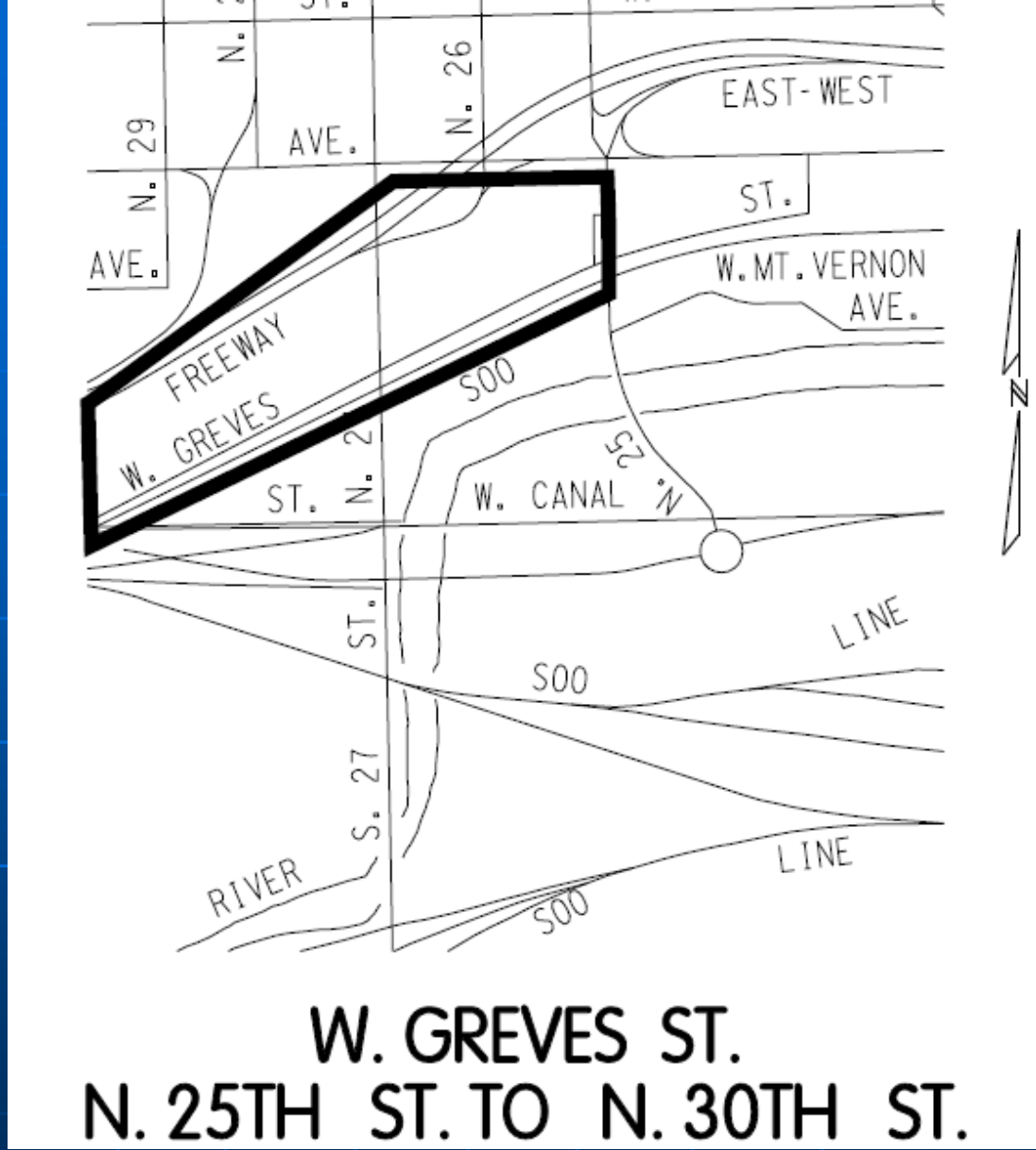
**N. PLANKINTON AVE.
W. ST. PAUL AVE. TO W. CLYBOURN ST.
SEPARATION**

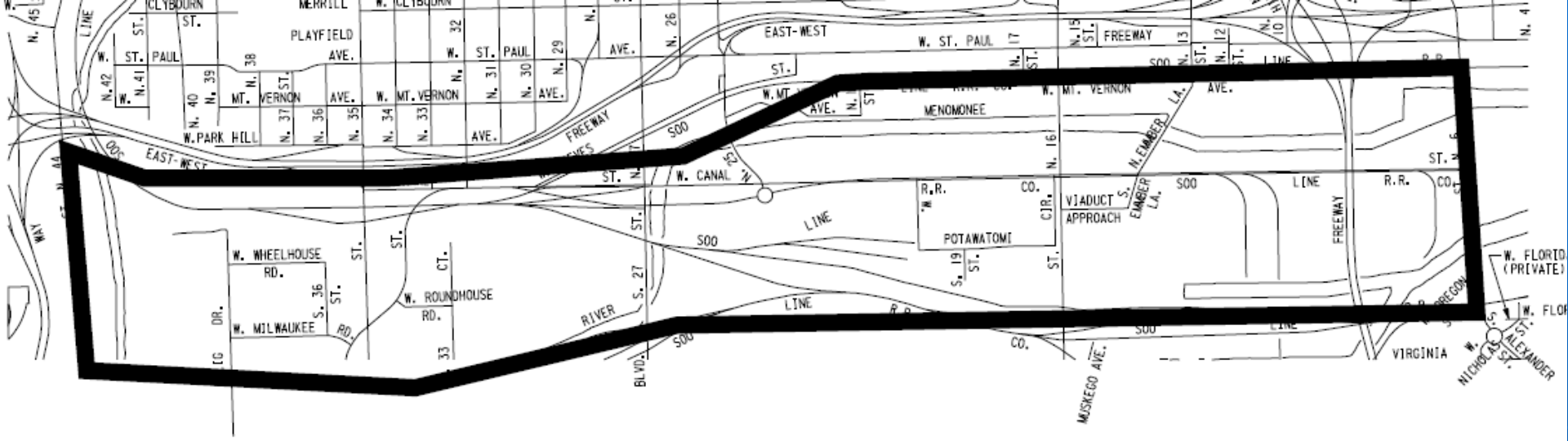


- Storm Flow was diverted into the Menomonee River at N 41st St
- A 76 by 48 inch storm sewer was constructed



- Storm sewers were constructed to convey additional street drainage
- Storm flow was diverted from the combined sewer to an existing storm sewer





W. CANAL ST. (MENOMONEE VALLEY) S. 6TH TO S. 44TH ST. SEPARATION

- Sanitary and storm sewers were constructed
- Multiple storm sewers discharged into the Menomonee River
- Several new developments have been constructed in this area



Difficulties in Separation

- Large storm sewers will need to be constructed to a waterway outlet
- Roadway Construction would have a negative impact in the downtown area and to businesses
- Private plumbing would need to be modified to separate the flow
- NR 151 Storm Water quality standards set by the DNR for 40% total suspended solids (TSS) removal would not be met
 - \$2.0 million is spent for every 1% of TSS removed from the storm system
- Additional storm water treatment devices will still need to be installed



Separation Totals

- Since 1968 the City has removed nearly 760 Acres from the Combined Sewer





CHRYSALIS ARCHAEOLOGICAL CONSULTANTS



Based on MMSD's 2020 Facilities Plan,
Chapter 9A, it would cost \$3-4 billion
dollars to separate 89% of the Combined
Sewers



Stormwater Management Plans

- All new developments in the City are required to complete a Storm Water Management Plan (SWMP) if the development results in one acre or more of disturbance or an addition of one half acre of new impervious surface.
- 1156 SWMP's submitted to the City since 1993 covering private, County, State and City owned properties
- The submitted SWMPs comply with both City of Milwaukee Chapter 120 and MMSD Chapter 13
- Since 2006 all developments are required to reduce flows by 10%
- Since 1993 93 SWMP's were submitted for projects located in the combined sewer area covering a total area of 400 acres
- City requirements are more strict than MMSD and the DNR



Highland Gardens Development



As a result of Best Management Practices (BMP's) during a 100-year rain event 250,000 gallons, and during a 2-year rain event 100,000 gallons are eliminated from the combined sewer





Bio-Retention Facility at 35th and Canal





All developments adjacent to the River are required to discharge their storm water to the river
(Harley Davidson Museum Parking Lot)



Flow Reduction Practices

- Bio-retention
- Detention Ponds
- Pervious Pavements
- Rain Gardens and Barrels
- Downspout Disconnection
- Green Streets
- Green Roofs
- Inlet Restrictors

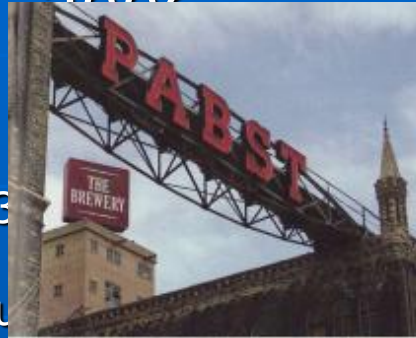


Rain Garden



Private Projects in the Combined Sewer Area since 2006

- Pabst Brewery – N 8th and I-43
- Harbor Front Condo – S Milwaukee
- North End – N Water and Lyon



These projects have incorporated Stormwater Management and separation



Private Projects in the Central Business District 2008

- Beer Line – N Commerce Street
- City Lights – N 25th and St Paul
- The Edge – N Commerce St.
- Reed Street – Will be constructed



Green Roofs in the Combined Sewer Area



Convent Hill



Rockwell Automation



MMSD's Seeboth Street Building



Highland Gardens Development



Additional Green Roof Locations

- Central Library at 816 W Wisconsin Ave
- Olga Village at 7th and Washington
- Cherry Court Development at 18th and Cherry
- Hillside Family Resource Center at 7th and Cherry
- Community Services Building at 6th and Reservoir
- City of Milwaukee 809 Building



Green Roof projects eliminate storm flow from the combined sewer





Questions

